Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 14 (6): 1109–1113
https://doi.org/10.15560/14.6.1109

PENSOFT

First report of *Psammolestes tertius* Lent & Jurberg, 1965 (Hemiptera, Reduviidae, Triatominae) in Rio Grande do Norte state, Brazil

Andressa Noronha Barbosa da Silva[1], Liléia Diotaiuti[2], Antonia Claudia Jácome da Câmara[3], Pedro Igor Câmara de Oliveira[4], Lúcia Maria da Cunha Galvão[1], Egler Chiari[1], Rita de Cássia Moreira de Souza[2]

1 Universidade Federal de Minas Gerais, Departamento de Parasitologia, Instituto de Ciências Biológicas, Programa de Pós-Graduação em Parasitologia, Avenida Presidente Antônio Carlos, n° 6627, Pampulha, Belo Horizonte, Minas Gerais.MG, CEP: 31270-901, Brazil. **2** Instituto René Rachou-Fiocruz Minas, Triatomine Research Group, Avenida Augusto de Lima, n° 1715, Barro Preto, Belo Horizonte, Minas Gerais.MG, CEP: 30190-002, Brazil. **3** Universidade Federal do Rio Grande do Norte, Centro de Ciências da Saúde, Departamento de Análises Clínicas e Toxicológicas, Rua General Gustavo Cordeiro de Faria, s/n°, Praia do Meio, Natal, Rio Grande do Norte. RN, CEP: 59010-115, Brazil. **4** Universidade Federal do Rio Grande do Norte, Instituto Metrópole Digital, Programa de Pós-Graduação em Bioinformática, Avenida Odilon Gomes de Lima, n° 1722, Capim Macio, Natal, Rio Grande do Norte. RN, CEP: 59078-400, Brazil.
Corresponding author: Rita de Cássia Moreira de Souza, rita@minas.fiocruz.br

Abstract
We report the first known occurrence of *Psammolestes tertius* Lent & Jurberg, 1965 (Hemiptera, Reduviidae, Triatominae) in the state of Rio Grande do Norte, Brazil. In 2009 and 2017, 2 adult specimens, a female and a male respectively, were collected at the Seridó Ecological Station, which is located in the municipality of Serra Negra do Norte. These records broadens the geographical distribution of *P. tertius* in Brazil and the biodiversity of triatomines in Rio Grande do Norte.

Key words
Chagas disease; vector; conservation units; ecological station; caatinga; geographical distribution.

Academic editor: Hélcio R. Gil-Santana | Received 15 June 2018 | Accepted 29 August 2018 | Published 7 December 2018

Citation: da Silva ANB, Diotaiuti L, Câmara ACJ, Oliveira PIC, Galvão LMC, Chiari E, Souza RCM (2018) First report of *Psammolestes tertius* Lent & Jurberg, 1965 (Hemiptera, Reduviidae, Triatominae) in Rio Grande do Norte state, Brazil. Check List 14 (6): 1109–1113. https://doi.org/10.15560/14.6.1109

Introduction

Triatomines (Hemiptera, Reduviidae, Triatominae) are hematophagous insects widely scattered in natural and artificial ecotopes (Schofield 2000). Various species are important vectors of *Trypanosoma cruzi* (Chagas, 1909), the etiologic agent of Chagas disease, while others are of little importance from an epidemiological point of view, especially those with low adaptability to artificial ecotopes. Currently, the subfamily Triatominae contains more than 150 species, grouped in 5 tribes and 18 genera (Mendonça et al. 2016, Souza et al. 2016, Oliveira and Alevi 2017, Monteiro et al. 2018, Oliveira et al. 2018).

The genus *Psammolestes* Bergroth, 1911 comprises only 3 species: *Psammolestes arthuri* Pinto, 1926; *Psammolestes coreodes* Bergroth, 1911, and *Psammolestes tertius* Lent & Jurberg, 1965. These species are strongly associated with bird nests. Thus, the rates of *T. cruzi* infection tend to be low and the role of these species in the epidemiology of human disease remains uncertain (Lent and Wygodzinsky 1979).

Copyright *da Silva et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Psammolestes arthuri can be found in Colombia and Venezuela. However, *P. coreodes* has a distribution that includes Argentina, Bolivia, Brazil (Mato Grosso, Mato Grosso do Sul, and Pernambuco states) and Paraguay. *Psammolestes tertius* occurs in Southeast (Minas Gerais and São Paulo), Midwest (Goiás and Mato Grosso), North (Pará, Tocantins), and Northeast (Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco and Piauí) regions of Brazil and Peru (San Martín) (Silveira et al. 1984, Cabrera 2006, Galvão et al. 2014). Species of the genus *Psammolestes* have known to occur in nests of the following families of birds: Dendrocolaptidae, Troglodytidae, Furnariidae, Mimidae, and Icteridae (Pinto and Lent, 1935, Pifano 1938, Barretto and Albuquerque 1969, Sherlock and Guitton 1973, Sick 1997, Cruz-Guzmán et al. 2014).

In a comparison using RAPD markers of 2 different populations of *P. tertius* from Ceará and Minas Gerais states and associated with different species of birds (Furnariidae), Soares et al. (2001) demonstrated intraspecific variability, which was probably related to differences in the characteristics of the Caatinga and Cerrado biomes. However, this variability was not corroborated by Oliveira et al. (2016) in a study that compared 2 populations, from Bahia and Ceará states, by means of cytogenetics.

In Rio Grande do Norte state, in the Northeast region of Brazil, at least 8 triatomine species occur naturally: *Panstrongylus lutzi* Neiva & Pinto, 1926, *Panstrongylus megistus* Burmeister, 1835, *Rhodnius nasutus* Stal, 1859, *Triatoma brasiliensis* Neiva, 1911, *Triatoma melanocephala* Neiva & Pinto, 1923, *Triatoma pseudomaculata* Corrêa & Spínola, 1964, *Triatoma petrocchiae* Pinto & Barreto, 1925, and *Triatoma rubrofasciata* (De Geer, 1773) were already identified (Castro-Filho and Silveira 1979, Silveira 2011, Gurgel-Gonçalves et al. 2012, Galvão 2014). One record of *Rhodnius neglectus* Lent, 1954 by Silveira (2011) from Rio Grande do Norte could represent a labeling error or a misidentification; it probably was *R. nasutus*. Despite Rio Grande do Norte having borders with Ceará and Paraíba, where occurrences of *P. tertius* are known, our new record is the first for this species in Rio Grande do Norte.

Methods

The Ecological Station of Seridó (ESEC-Seridó), in Rio Grande do Norte, where insects were collected is located in the municipality of Serra Negra do Norte (Fig. 1). This ecological station is within the Caatinga biome of Seridó region. This region is characterized by high solar irradiance, high average annual temperature and potential evapotranspiration, and low relative humidity and precipitation, which is erratic most of the year and occurs only during a short period (Prado 2003).

Station employees collected specimens on the external wall of the accommodation for researchers by manual capture. These specimens were sent to the Universidade Federal do Rio Grande do Norte, where they were morphologically identified according the characteristics of the head and anterolateral angle of the pronotum described by Lent and Wygodzinsky (1979) for the 2 species of genus *Psammolestes* that occur in Brazil. The specimens were deposited in the Collection of Chagas Disease Vectors (Fiocruz-COLVEC), René Rachou Institute, regional unit of the Oswaldo Cruz Foundation (IRR/Fiocruz). The measurements were made using a Leica M205-C stereomicroscope with a DMC 2900 Leica and LAS software v. 4.9, with a magnification of 7.7×.

Results

New records. Brazil: Rio Grande do Norte: municipality of Serra Negra do Norte, Ecological Station of Seridó (06°34′74″ S, 037°15′88″ W), coll. by Adalberto Antônio Varela-Freire, 5 May 2009 at 0:30 h (1 female, Fiocruz-COLVEC 9966) (Fig. 2A). Brazil: Rio Grande do Norte: municipality of Serra Negra do Norte, within the Ecological Station of Seridó (06°34′26″ S, 037°15′49″ W), coll. by Ramayana Morais de Medeiros Brito, 26 October 2017, at 20:00 h (1 male, Fiocruz-COLVEC 9980) (Fig. 2B).

Identification. Both specimens were identified as *Psammolestes tertius* based on head characteristics: head a little longer than broad, at the level of eyes and excluding neck, with moderate slope behind of the ocelli and the pronotal anterolateral angles very short and obtuse. *Psammolestes coreodes* presents a head with length equal to or slightly smaller than width, at the level of eyes and excluding neck, with a sharp slope behind of the ocelli, and anterolateral angles of the pronotum cuspidal.

Discussion

The genus *Psammolestes* comprised 3 species and seem to have specialized to exploit bird nest microhabitats (Lent and Wygodzinsky 1979). These species are distributed in South America, with a clear ecological niche differences. A recent study predicted the potential geographical distribution for the 3 *Psammolestes* species using ecological niche modeling. The models support that *P. arthuri* occurs in warm and humid areas, *P. coreodes* occupies the driest and coldest areas, and *P. tertius* lives in climatically intermediate areas in the higher altitudes. For *Psammolestes tertius*, this potential area includes the Rio Grande do Norte state (Gurgel-Gonçalves and Silva 2009). Thus, the new records are an important basis for future study and reinforce Gurgel-Gonçalves and Silva's (2009) theoretical model of *Psammolestes* species distribution.

Specimens of *Prosopis juliflora* (Sw) DC 1753 (Leguminosae, Mimosodea) were being removed during 2009 in an effort to eliminate non-native tree species from the semi-arid reserve area. In some of these trees, a species of bird, *Pseudoseisura cristata* Spix, 1824 (Passeriforme, Furnariidae), were observed alive. According to Hughes

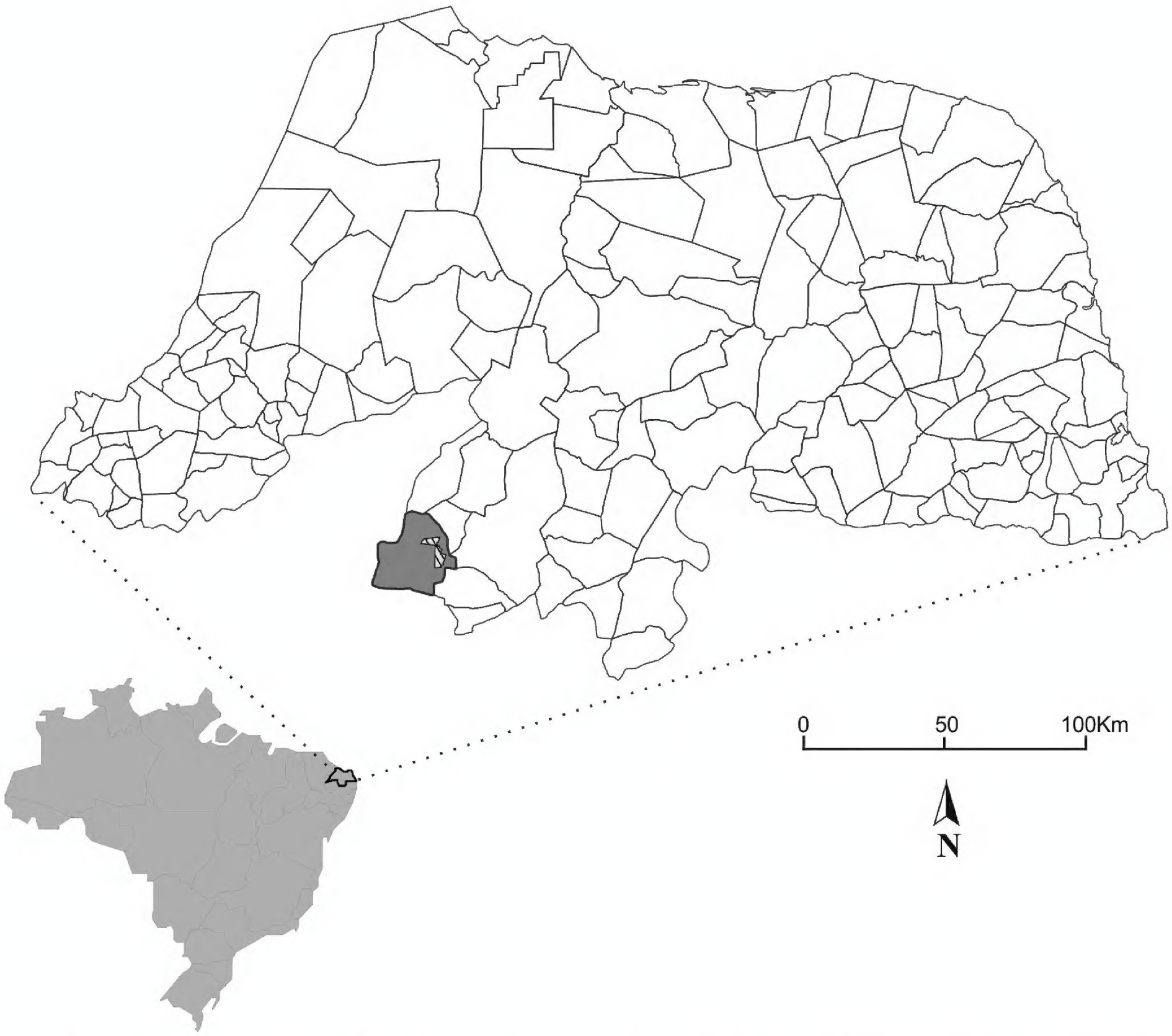

Figure 1. Geographical localization of the Rio Grande do Norte state (Brazil). Highlighting to Serra Negra do Norte municipality and the Estação Ecológica do Seridó (hatched area), where *Psammolestes tertius* were caught.

and Santos (2008), these birds exhibit a marked preference to nest in *P. cristata*. After the removal of these trees, it is possible that the specimens of *P. tertius* were attracted by light of the building on which they were found.

With regards to the male specimen of *P. tertius*, 2017 was the sixth year in a row in which lower than average rainfall was recorded in the region. This, in turn, might have resulted in a scarcity of food resources that might have induced wider than usual dispersion of this insect species.

Based on the 2 new records, we propose that the distribution of *P. tertius* be expanded to include Rio Grande do Norte state, which brings the number of autochthonous triatomine to at least 9 (Castro-Filho and Silveira 1979, Silveira 2011, Gurgel-Gonçalves et al. 2012, Galvão 2014). The dispersion mechanisms of *P. tertius* are not fully understood, although there is evidence that passive dispersion of eggs adhered to bird feathers may occur (Schofield 1994). We do not know the degree to which the park is infested by *P. tertius*, as an active search was not carried out, but probably the infestation is closely related to seasonal variables, such as the nesting period of the birds, which constitute the main feeding source for these insects (Espinola 1985).

The ESEC-Seridó, despite of its small area, is of great importance within the context of conserving the biodiversity of the Caatinga biome. This place shelters a great diversity of animal and plant species, including the first known occurrence of P. *tertius* in Rio Grande do Norte. The preservation and maintenance of this reserve should be a priority.

Acknowledgements

This work received financial support from the Conselho Nacional de Desenvolvimento Científico e Tecnlógico (CNPq/Edital MCT/CNPq Universal Nº 472251/2010-4) and a fellowship from the Coordenação de Aperfeiçoamento do Pessoal do Ensino superior (CAPES/ Programa de Incentivo a Parasitologia Básica. Nº 23038.005288/2011-48). We are grateful to the Estação Ecológica do Seridó (ESEC Seridó), Instituto Chico Mendes de Conservação

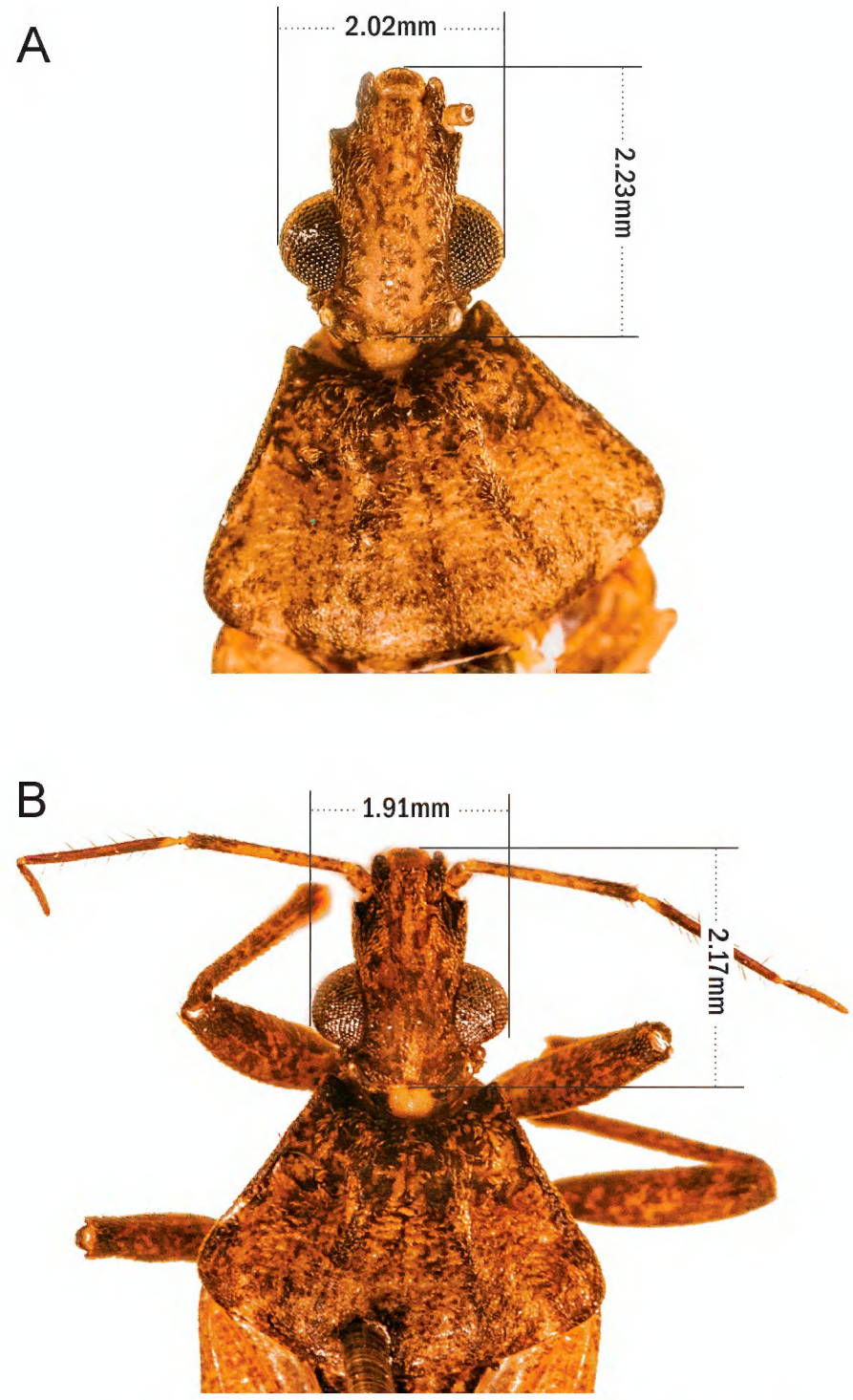

Figure 2. Head measurements of *Psammolestes tertius*. **A.** Female. **B.** Male. Both captured in the municipality of Serra Negra do Norte, Ecological Station of Seridó, RN, Brazil.

da Biodiversidade (ICMBio), Collection of Chagas Disease Vectors (Fiocruz-Colvec). Dr Paloma Helena Fernandes Shimabukuro (IRR/Fiocruz Minas) and Cyro José generously provided us measurements and photographs, respectively. We thank the late Adalberto Antônio Varela-Freire from the Departamento de Microbiologia e Parasitologia and Carlos Varela-Freire for their technical assistance. Finally, our appreciation is extended to the reviewers and the academic editor for their constructive suggestions that greatly improved the manuscript.

Authors' Contributions

ACJC collected the data; EC and ACJC sought financial support for this study; ACJC and RCMS identified the specimens; ANBS, RCMS, LD, LMCG and PICO wrote the text. ANBS produced the map; all authors revised the text.

References

Barretto MP, Albuquerque RDR (1969) Estudos sobre reservatorios e vectores silvestres do *Trypanosoma cruzi*. XXXIII. Infecção experimental e natural do *Psammolestes tertius* Lent & Jurberg, 1965 pelo *T. cruzi*. Revista do Instituto de Medicina Tropical 11: 4.

Cabrera R (2006) Notas breves sobre *Psammolestes tertius* Bergroth, 1911 (Reduviidae: Hemiptera): un triatomino silvestre. Anales de la Facultad de Medicina 67: 345–365. http://doi.org/10.15381/anales.v67i4.1317

Castro-Filho J, Silveira AC (1979) Distribution of Chagas disease in Brazil. Revista Brasileira de Malariologia e Doenças Tropicais 31: 85–98.

Cruz-Guzmán PJ, Morocoima A, Chique JD, Quintero JR, Uzcátegui MT, Carrasco HJ (2014) *Psammolestes arthuri* naturalmente infectado con *Trypanosoma cruzi* encontrado en simpatria con *Rhodnius prolixus* y *Triatoma maculata* em nidos de aves em el estado Anzoátegui, Venezuela. Saber, Universidad de Oriente 26: 428–440.

Espinola HN (1985) Brasil. In Carcavallo RU, Rabinovich JE, Tonn RJ (Eds) Factores Biologicos y Ecologicos en la Enfermedad de Chagas. Tomo II. Parasitos, Reservorios, Control, Situacion Regional, organización Panamericana de la Salud (OMS), Serviço Nacional de Chagas, República Argentina, 363–372.

Galvão C (2014) Vetores da doença de Chagas no Brasil. Sociedade Brasileira de Zoologia, Curitiba, 289 pp.

Gurgel-Gonçalves R, Galvão C, Costa J, Peterson AT (2012) Geographic distribution of Chagas disease vectors in Brazil based on ecological niche modeling. Journal of Tropical Medicine 2012: 705326. https://doi.org/10.1155/2012/705326

Gurgel-Gonçalves R, Silva RB (2009) Analysis of the geographical distribution of *Psammolestes* Bergroth (Heteroptera: Reduviidae) in South America with new records of *Psammolestes tertius* Lent & Jurberg. Zootaxa 2033: 41–48.

Hughes FM, Santos IB (2008) Distribuição espacial e uso do habitat por *Pseudoseisura cristata* (Furnariidae), área de Caatinga do Nordeste Brasileiro. Livro de Resumos do 16° Congresso Brasileiro de Ornintologia da Sociedade Brasileira de Ornintologia, Palmas, 220 pp.

IBGE (2010) ftp://ftp.ibge.gov.br/Censos/Censo_Demografico_2010. Instituto Brasileiro de Geografia e Estatística. Accessed on: 2018-5-31.

Lent H, Wygodzinsky P (1979) Revision of the Triatominae (Hemiptera, Reduviidae), and their significance as vectors of Chagas' disease. *Bulletin of the American Museum of Natural History* 163: 123–520.

Mendonça VJ, Alevi KCC, Pinotti H, Gurgel-Gonçalves R, Pita S, Guerra AL, Panzera F, De Araújo RF, Azeredo-Oliver MT, Rosa JA (2016) Revalidation of *Triatoma bahiensis* Sherlock and Serafim, 1967 (Hemiptera, Reduviidae) and phylogeny of the *T. brasiliensis* species complex. Zootaxa 4107 (2): 239–254. https://doi.org/10.11646/zootaxa.4107.2.6

Monteiro FA, Weirauch C, Felix M, Lazoski C, Abad-Franch F (2018) Evolution, systematics, and biogeography of the Triatominae, vectors of Chagas disease. In: Rollinson D, Stothard JR (Eds) Advances in Parasitology, Cambridge, Massachusetts: Academic, 265–344.

Oliveira J, Alevi KCC, Fonseca EO, Souza OM, Santos CG, Azeredo-Oliveira MTV, Rosa JÁ (2016) New record and cytogenetic analysis of *Psammolestes tertius* Lent & Jurberg, 1965 (Hemiptera, Reduviidae, Triatominae) from Bahia state, Brazil. Genetic Molecular Research 15: 1–6. https://doi.org/10.4238/gmr.15028004

Oliveira O, Alevi KCC (2017) Taxonomic status of *Panstrongylus herreri* Wygodzinsky, 1948 and the number of Chagas disease vectors. Revista da Sociedade Brasileira de Medicina Tropical 50 (3): 434–435. https://doi.org/10.1590/0037-8682-0125–2017

Oliveira J, Ayala JM, Justi SA, Rosa JA, Galvão C (2018) Description of a new species of *Nesotriatoma* Usiger, 1944 from Cuba and revalidation of synonymy between *Nesotriatoma bruneri* (Usinger, 1944) and *N. flavida* (Neiva, 1911) (Hemiptera, Reduviidade, Triatominae). Journal of Vector Ecology 43 (1): 148–157. https://doi.org/10.1111/jvec.12294

Pifano F (1938) Anotaciones acerca del *Psammolestes arthuri* (Pinto, 1926) (Hemiptera, Heteroptera,Triatomidae) reduvideo hematofago encontrado en nidos de "cucarachero de monte (probablemente, Dendrocolaptidae) en un sector de los valles de Yaracuy. Gaceta Mededica de Caracas 45: 241–245.

Pinto C, Lent H (1935) Sobre as espécies do genero *Psammolestes* Bergroth, 1911 (Hemiptera, Triatomidae). Anais da Academia Brasileira de Ciências 7: 333–337.

Prado DE (2003) As Caatingas da América do Sul. In: Leal IR, Tabarelli M, Silva JMC (Eds) Ecologia e Conservação da Caatinga, Editora Universitária da UFPE, Recife, 3–74.

Schofield CJ (1994) Triatominae. Biology & Control. Eurocommunica Publications, Bognor Regis, UK, 77 pp.

Schofield CJ (2000) Biosystematics and evolution of the Triatominae. Caderno de Saúde Pública 16: 89–92. https://doi.org/10.1590/S0102-311X2000000800010

Sick H (1997) Ornitologia Brasileira. Editora Nova Fronteira, Rio de Janeiro, 862 pp.

Silveira AC (2011) Entomological Survey (1975-1983). Revista da Sociedade Brasileira de Medicina Tropical 44: 26–32. https://doi.org/10.1590/S0037-86822011000800005

Silveira AC, Feitosa VR, Borges R (1984) Distribution of Triatominae captured in a Domestic Environment, 1975/83, Brazil. Revista Brasileira de Malariologia e Doenças Tropicais 36: 15–312.

Sherlock IA, Guitton N (1974) Fauna Triatominae do estado da Bahia—Brasil III—Notas sobre ecótopos silvestres e o gênero *Psammolestes.* Mem Inst Oswaldo Cruz 72: 91–101.

Soares RPP, Barbosa SE, Borges EC, Melo Júnior TA, Romanha AJ, Dujardin JP, Schofield CJ, Diotaiuti L (2001) Genetic studies of *Psammolestes tertius* (Hemiptera, Reduviidae, Triatominae) using male genital morphology, Morphometry, Isoenzymes, and random amplified polymorphic DNA. Biochemical Genetics 39: 1–13.

Souza ED, Von Atzingen NC, Furtado MB, de Oliveira J, Nascimento JD, Vendrami DP, Gardim S, Rosa JA (2016) Description of *Rhodnius marabaensis* sp. n. (Hemiptera, Reduviidae, Triatominae) from Pará state, Brazil. ZooKeys 621: 45–62. https://doi.org/10.3897/zookeys.621.9662